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Claims 3, 4, 8, 9, 10, 16, 17, 22, and 23 are rejected under 35 U. S. C. § 112, first paragraph, as containing subject matter which was not described in the specification such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

Applicant has canceled claims 3, 4, 16, and 17. As such, the rejection of these claims is moot.

Applicant has amended claims 8, 9, 10, 22, and 23 as discussed below. As such, the rejection of these claims is moot.

Therefore, in view of this amendment, the Applicant respectfully request that the rejection be withdrawn.

2. Claims 8, 9, 10, 22, and 23

Claims 8, 9, 10, 22, and 23 are rejected under 35 U. S. C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner states that the limitation "second" in the last line of each of these claims should be —first— and requests clarification.

Applicant has amended claims 8, 9, 10, 22, and 23 as suggested by the Examiner. The amended claims 8, 9, 10, 22, and 23 recite the limitation —the first robot blade— in the last line of each of these claims.

Therefore, the Applicant submits that claims 8, 9, 10, 22, and 23, in rewritten form, fully satisfy the requirements of 35 U. S. C. § 112, second paragraph, and are patentable thereunder. The amendment to these claims is made merely to correctly identify the blade that is connected to the first extension arm. This amendment has not narrowed the scope of the claims, as filed.

Therefore, in view of this amendment, the applicant respectfully requests that the rejection be withdrawn.

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B. 35 U. S. C. § 102

1. Claims 1, 6, 7, 11, 12, 13, 14, 19, 20, 21 and 24-49 (read as 24-29)

Claims 1, 6, 7, 11, 12, 13, 14, 19, 20, 21 and 24-29 are rejected under 35 U. S. C. § 102(b) as being anticipated by Bacchi et al. (United States patent No. 6,765,444 issued Jun. 16, 1998). Specifically, the Examiner states, in general terms, the anticipation and, in reference to claims 24-29 notes Figure 10, wherein each blade can be moved to an aligned position A or to an offset position B or C. The rejection is respectfully traversed.

Bacchi et al. teaches a multi-link robotic system having a motor coupled to a rotating central link and comprising the robot arm mechanisms wherein each arm uses 2 motors and 3 links rotating around 3 axes. Therefore, a two-arm system comprised 5 motors, 7 axes of rotation, a central link, and 6 links in the arms to position an object such as a wafer.

In contrast, the applicant's invention is a robot apparatus having 1 motor coupled to a rotating central link and comprising the robot arm mechanisms wherein each arm uses 1 motor and 3 links that rotate around 2 axes. A two-arm apparatus comprises 3 motors, 5 axes of rotation, a central link, and 4 links in the arms to position an object such as a wafer. Therefore, the applicant's invention claims a more efficient robotic apparatus. Furthermore, Bacchi et al. does not teach or suggest how to position an object such as a wafer using less than 5 motors, 7 axes of rotation, and an arm having less than 2 motors and 4 rotating links. In reference to the cited Figure 10, it should be noted the inventive apparatus positions an object such as a wafer to an aligned position A or to an offset position B or C in a more efficient manner than Bacchi et al., e.g., by using 2-link arms having only 1 motor in each arm.

The specific advantages of the applicant's invention are recited in the independent claims as follows:

"1. A robot apparatus to be mounted on a robot hub, the robot apparatus comprising:

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a main robot link fixedly mounted to the robot hub;
a first robot extension arm rotatably mounted to a first end of the main robot link;
a second robot extension arm rotatably mounted to a second end of the main robot link, the first end of the main robot link being located on a distal end of the main robot link from the second end of the main robot link;
a first robot blade being mounted to the first robot extension arm;
a second robot blade being mounted to the second robot extension arm;
a hub motor providing controllable rotational motion of the main robot link about the robot hub;
a first extension motor configured to provide controllable simultaneous extension or retraction of the first robot extension arm and the first robot blade; and
a second extension motor configured to provide controllable simultaneous extension or retraction of the second robot extension arm and the second robot blade."(emphasis added).

The applicant's invention, as recited in claim 1, specifically states that the extension motor in each arm simultaneously controls both the arm and the robot blade. Applicant's independent claims 11 and 24 recite similar limitations.

In contrast, Bacchi et al. teaches using 2 motors in each arm to independently move the arm components and the blade. As such, Bacchi et al. does not teach each and every limitation of the applicant's claims 1, 11, and 24.

Therefore, the Applicant submits that independent claims 1, 11, and 24 are not anticipated by Bacchi et al. and are patentable under 35 U. S. C. § 102(b).

Claims 6, 7, 12, 13, 14, 19, 20, 21 and 25-29 depend either directly or indirectly from respective independent claims 1, 11, and 24 and are patentable for the same reasons as recited above. As such, claims 6, 7, 12, 13, 14, 19, 20, 21 and 25-29 are patentable under 35 U. S. C. § 102(b).

2. Claims 1, 6, 7, 11, 12, 13, 14, 19, 20, 21 and 24-49

Claims 1, 6, 7, 11, 12, 13, 14, 19, 20, 21 and 24-29 are rejected under 35 U. S. C. § 102(e) as being anticipated by Bacchi et al. (United States patent No. 6,155,768, issued Dec. 5, 2000). Specifically, the Examiner states, in general terms, the

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anticipation and, in reference to claims 24-29 notes Figure 9. The rejection is respectfully traversed.

Bacchi et al. teaches a multi-link robotic system having a motor coupled to a rotating central link and comprising the robot arm mechanisms wherein each arm uses 2 motors and 3 links rotating around 3 axes. Therefore, a two-arm system comprised 5 motors, 7 axes of rotation, a central link, and 6 links in the arms to position an object such as a wafer. This system differs from a system that is disclosed in the '768 patent by using an offset hand to retain the object (in '768, a straight hand is used to retain the object). In reference to the cited Figure 9, it should be noted the inventive apparatus positions an object such as a wafer in a more efficient manner than Bacchi et al., e.g., by using 2-link arms having only 1 motor in each arm.

Therefore, in the '768 patent, Bacchi et al. teaches a robotic system that has the same disadvantages in respect to the applicant's invention as the robotic system of the '444 patent, as described above in Section B1. Furthermore, in '444, Bacchi et al. does not teach or suggest the inventive apparatus having 1 motor coupled to a rotating central link and comprising the robot arm mechanisms wherein each arm uses 1 motor and 3 links that rotate around 2 axes such that the extension motor in each arm simultaneously controls both the arm and the robot blade. Bacchi et al. does not teach each and every limitation of the applicant's claims.

Therefore, the Applicant submits that the invention, as claimed in independent claims 1, 11, and 24 and recited in Section B1, is not anticipated by Bacchi et al. and is patentable under 35 U. S. C. § 102(e).

Claims 6, 7, 12, 13, 14, 19, 20, 21 and 25-29 depend either directly or indirectly from the respective independent claims 1, 11, and 24 and are patentable for the same reasons as recited above. As such, claims 6, 7, 12, 13, 14, 19, 20, 21 and 25-29 are patentable under 35 U. S. C. § 102(e).

C. 35 U. S. C. § 103

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1. Claims 2, 3, 4, 15, 16, and 17

Claims 2, 3, 4, 15, 16, and 17 are rejected under 35 U. S. C. § 103(a) as being unpatentable over either Bacchi et al. (United States patent No. 6,155,768, issued Dec. 5, 2000) or Bacchi et al. (United States patent No. 5,765,444, issued Jul. 16, 1998) in view of Hiruma et al. (United States patent 6,212,968 B1, issued Apr. 10, 2001). Specifically, the Examiner states that it would be obvious to use stepper motors of Hiruma et al. in embodiments of Bacchi et al. to save weight and that the applicant's electromechanical and gear transmission or friction transmission system are equivalents to the stepper motors of Hiruma et al. The rejection is respectfully traversed.

Either of Bacchi et al. teaches a multi-link robotic system having a motor coupled to a rotating central link and comprising the robot arm mechanisms wherein each arm uses 2 motors and 3 links rotating around 3 axes. Therefore, as taught by Bacchi et al., a two-arm system comprises 5 motors, 7 axes of rotation, a central link, and 6 links in the arms to position an object such as a wafer.

Hiruma et al. teaches a robot having 2 arms for positioning objects along a vertical axis. The robot uses stepper motors located in the mount of the arms, where each arm comprises 2 links and 2 stepper motors. Such robot cannot position a wafer in a chamber of a cluster tool comprising the chambers that are arranged substantially circumferentially around the robot.

Therefore, a combination of Bacchi et al. and Hiruma et al. suggests a multi-link robotic system having a mount comprising 2 stepper motors for each robotic arm (i.e., in total 4 stepper motors for the robotic arms) and 1 motor coupled to a rotating central link.

In contrast, the applicant's invention is distinctly different from a combination of Bacchi et al. and Hiruma et al. The applicant's apparatus comprises 1 motor coupled to a rotating central link and each robot arm having 1 motor and 3 links that rotate around 2 axes. The applicant's invention specifically recites that the extension motor in each arm simultaneously controls the arm and the blade. A combination of Bacchi

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et al. and Hiruma et al. does not teach or suggest the applicant's invention as recited in independent claims 1, 11, and 24 as discussed above.

Furthermore, claim 2 depends from independent claim 1 and claim 15 depends from independent claim 11, which both are patentable over the cited references.

The applicant has canceled claims 3, 4, 16, and 17, therefore the rejection of these claims is moot.

Therefore, the applicant submits that claims 2 and 15 are patentable over Bacchi et al. and Hiruma et al. under 35 U. S. C. § 103(a).

Therefore, in view of this amendment, the applicant respectfully requests that the rejection be withdrawn.

2. Claims 5 and 18

Claims 5 and 18 are rejected under 35 U. S. C. § 103(a) as being unpatentable over either Bacchi et al. (United States patent No. 6,155,768, issued Dec. 5, 2000) or Bacchi et al. (United States patent No. 5,765,444, issued Jul. 16, 1998) in view of Tepolt (United States patent 5,746,565, issued May 5, 1998). Specifically, the Examiner states that it would be obvious to use two segment arms instead of three segment arms of teachings Bacchi et al. in view of Tepolt to provide a unitary linkage. The rejection is respectfully traversed.

Either the '768 Bacchi et al. or '444 Bacchi et al. teaches a multi-link robotic system having a motor coupled to a rotating central link and comprising the robot arm mechanisms wherein each arm uses 2 motors and 3 links rotating around 3 axes. Therefore, a two-arm system comprises 5 motors, 7 axes of rotation, a central link, and 6 links in the arms to position an object such as a wafer.

Tepolt teaches a robotic wafer handler having one 2-link arm for positioning a wafer along a horizontal axis. This reference does not disclose subject matter that would teach the limitations of the independent claims not taught by Bacchi et al., e.g.,

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using a motor in the arm to simultaneously control extension and retraction of the arm and the blade.

Therefore, no feasible combination of '768 and '444 Bacchi et al. and Tepolt suggests the use a motor in the arm to simultaneously control extension and retraction of the arm and the blade as recited in the applicant's independent claims.

Furthermore, claims 5 depends from independent claim 1 and claim 18 depends from independent claim 11, which both are patentable over the cited references as discussed above.

Therefore, the applicant submits that claims 5 and 18 are patentable over '768 and '444 Bacchi et al. and Tepolt under 35 U. S. C. § 103(a).

Conclusion

Thus, the Applicant submits that all of the claims now fully satisfy the requirements of 35 U. S. C. § 102, 35 U. S. C. § 103, or 35 U. S. C. § 112. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of an adverse final action in any of the claims now pending in the application, it is kindly requested that the Examiner telephone Mr. Raymond R. Moser, Jr. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,
MOSER, PATTERSON & SHERIDAN, LLP

July 10, 2002


Joseph Ragnotta, Agent
Reg. No. 39,322
(732) 530-9404

Official

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Moser, Patterson & Sheridan, LLP
Attorneys at Law
595 Shrewsbury Avenue
First Floor
Shrewsbury, New Jersey 07702

Please continue to direct all correspondence to:

Patent Counsel
Applied Materials, Inc.
3050 Bowers Avenue
P. O. Box 450A
Santa Clara, CA 95052

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APPENDIX 1

Marked-up claims

Cancel claims 3, 4, 16, and 17.

8. (Amended) The robot apparatus of claim 1, further comprising a first pulley arrangement that transfers output motion from the first extension motor to simultaneous angular rotation of the first extension arm and angular rotation of the [second] first robot blade.

9. (Amended) The robot apparatus of claim 8, wherein the first pulley arrangement provides for angular rotation of the first extension arm that occurs at a fixed rate compared to the rate of the angular rotation of the [second] first robot blade.

10. (Amended) The robot apparatus of claim 8, wherein the first pulley arrangement provides for angular rotation of the first extension arm at a rate that is twice the rate of the angular rotation of the [second] first robot blade.

22. (Amended) The robot apparatus of claim 21, wherein the first pulley arrangement provides for angular rotation of the first extension arm that occurs at a fixed rate compared to the rate of the angular rotation of the [second] first robot blade.

23. (Amended) The robot apparatus of claim 21, wherein the first pulley arrangement provides for angular rotation of the first extension arm at a rate that is twice the rate of the angular rotation of the [second] first robot blade.